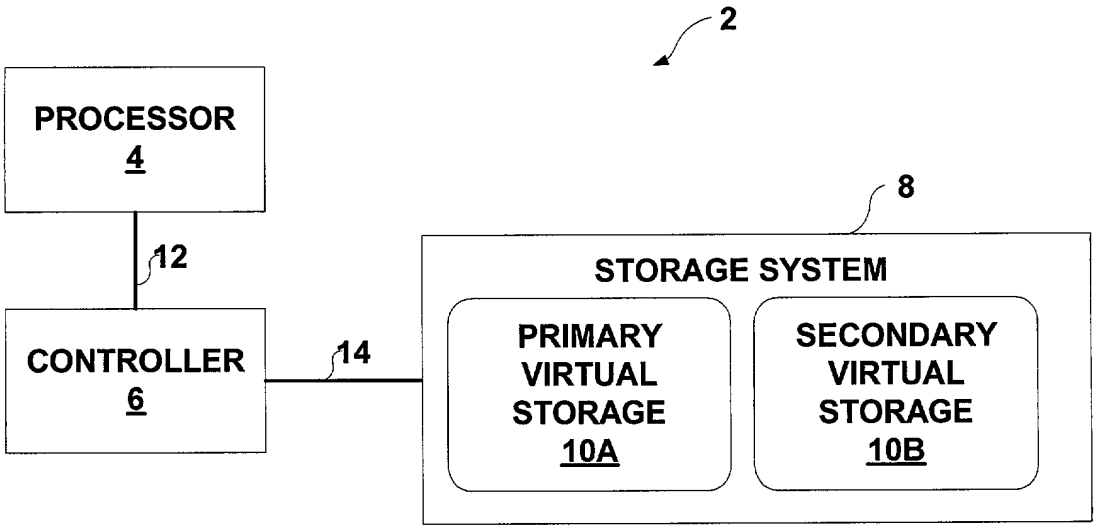
2
PROCESSOR
4
12
CONTROLLER
6
14
8
STORAGE SYSTEM
PRIMARY
VIRTUAL
STORAGE
10A
SECONDARY
VIRTUAL
STORAGE
10B

FIG. 1

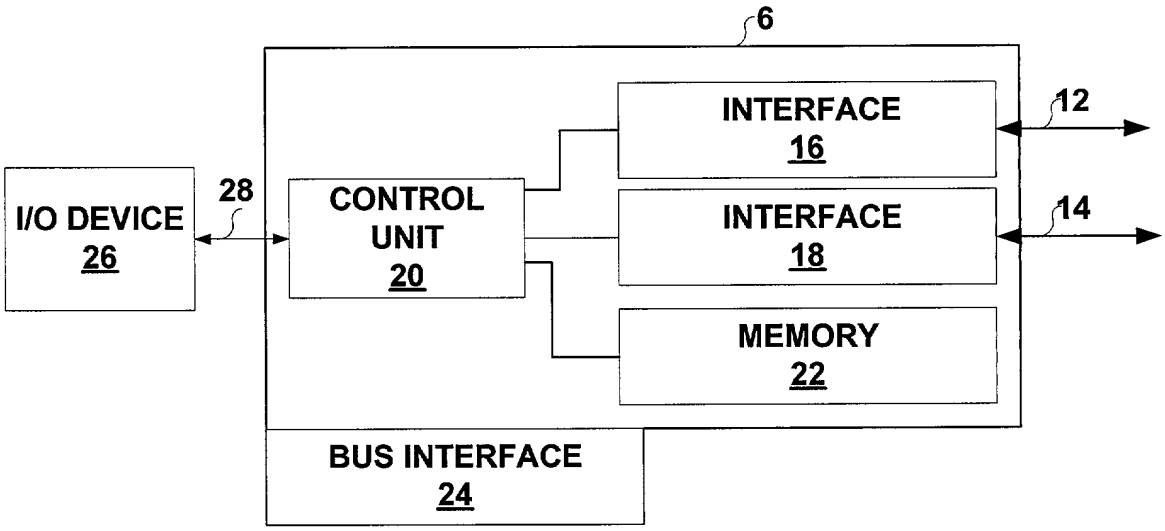
6
I/O DEVICE
26
28
CONTROL
UNIT
20
INTERFACE
16
INTERFACE
18
MEMORY
22
12
14
BUS INTERFACE
24

FIG. 2

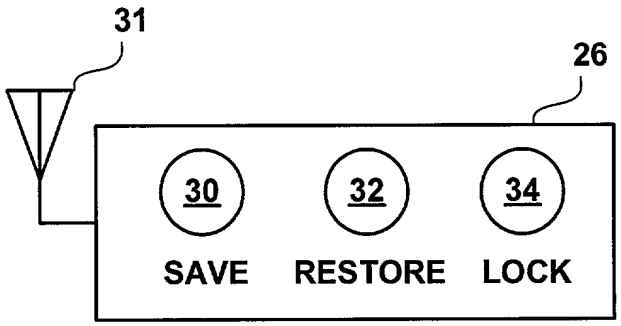

FIG. 3A

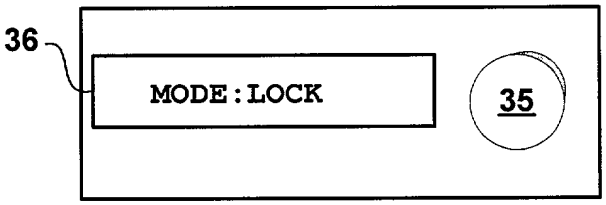

FIG. 3B

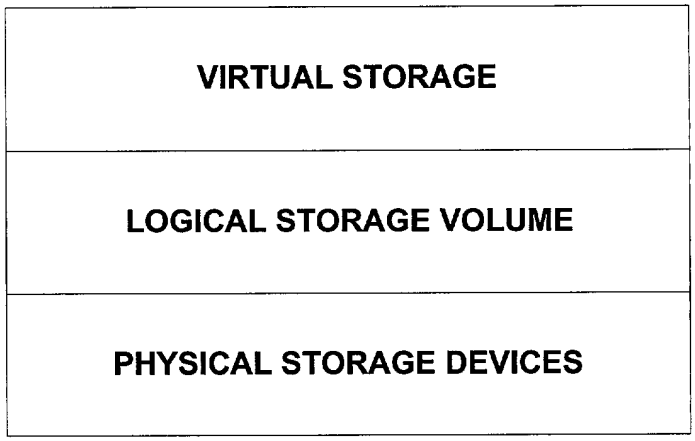

FIG. 4

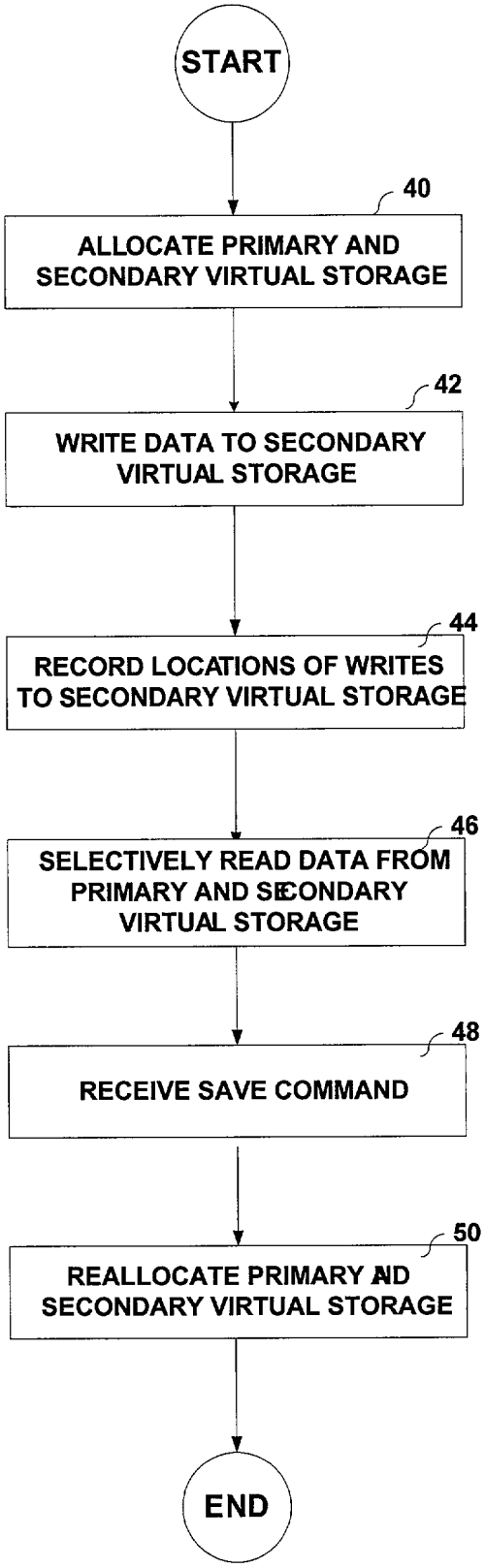
START
40
ALLOCATE PRIMARY AND SECONDARY VIRTUAL STORAGE
42
WRITE DATA TO SECONDARY VIRTUAL STORAGE
44
RECORD LOCATIONS OF WRITES TO SECONDARY VIRTUAL STORAGE
46
SELECTIVELY READ DATA FROM PRIMARY AND SECONDARY VIRTUAL STORAGE
48
RECEIVE SAVE COMMAND
50
REALLOCATE PRIMARY AND SECONDARY VIRTUAL STORAGE
END

FIG. 5

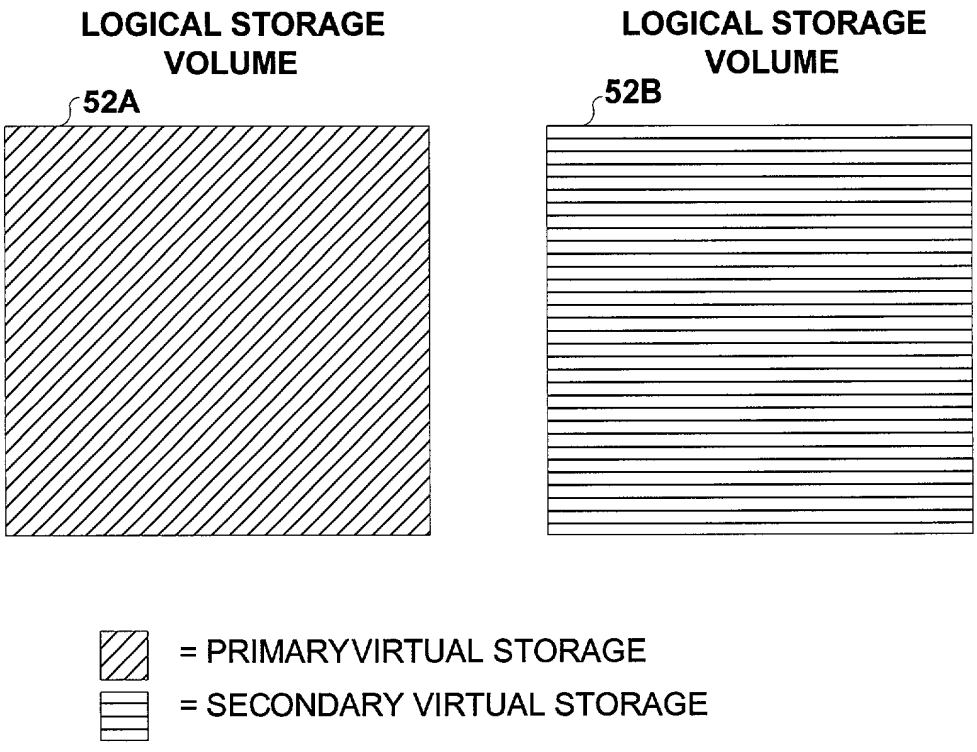
LOGICAL STORAGE VOLUME
52A
LOGICAL STORAGE VOLUME
52B
= PRIMARYVIRTUAL STORAGE
= SECONDARY VIRTUAL STORAGE

FIG. 6A

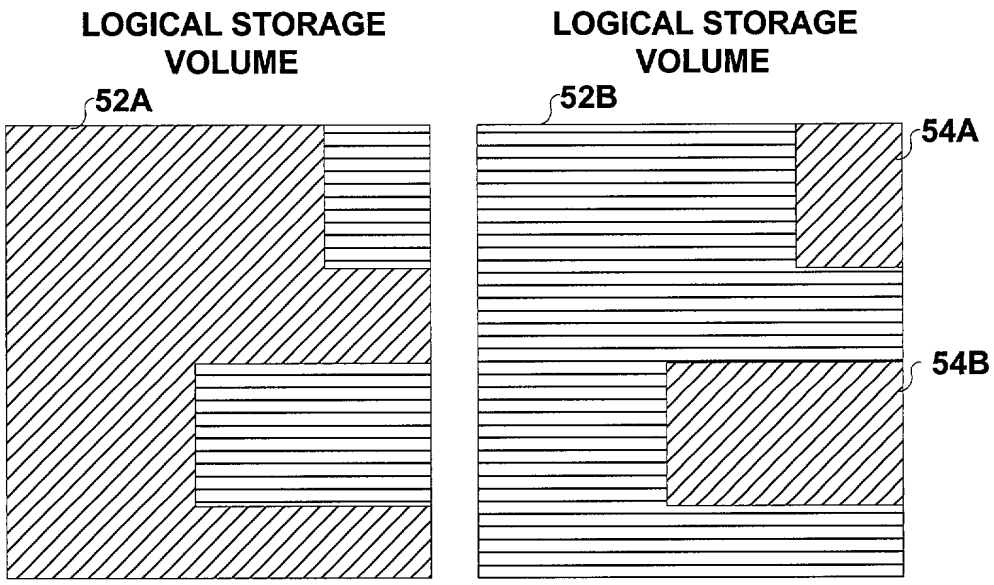
LOGICAL STORAGE VOLUME
52A
LOGICAL STORAGE VOLUME
52B
54A
54B

FIG. 6B

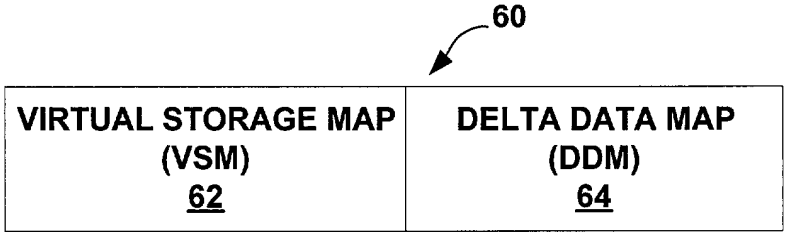

FIG. 7

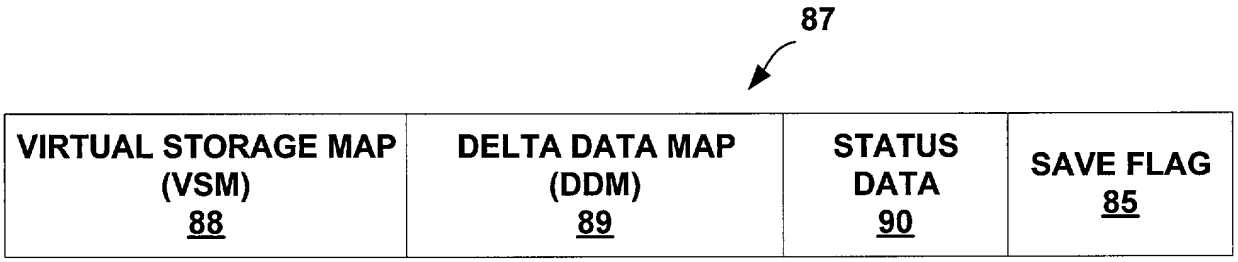

FIG. 10

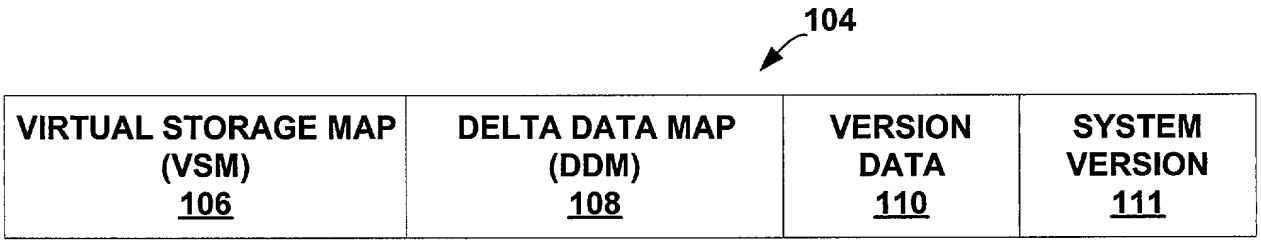

FIG. 12

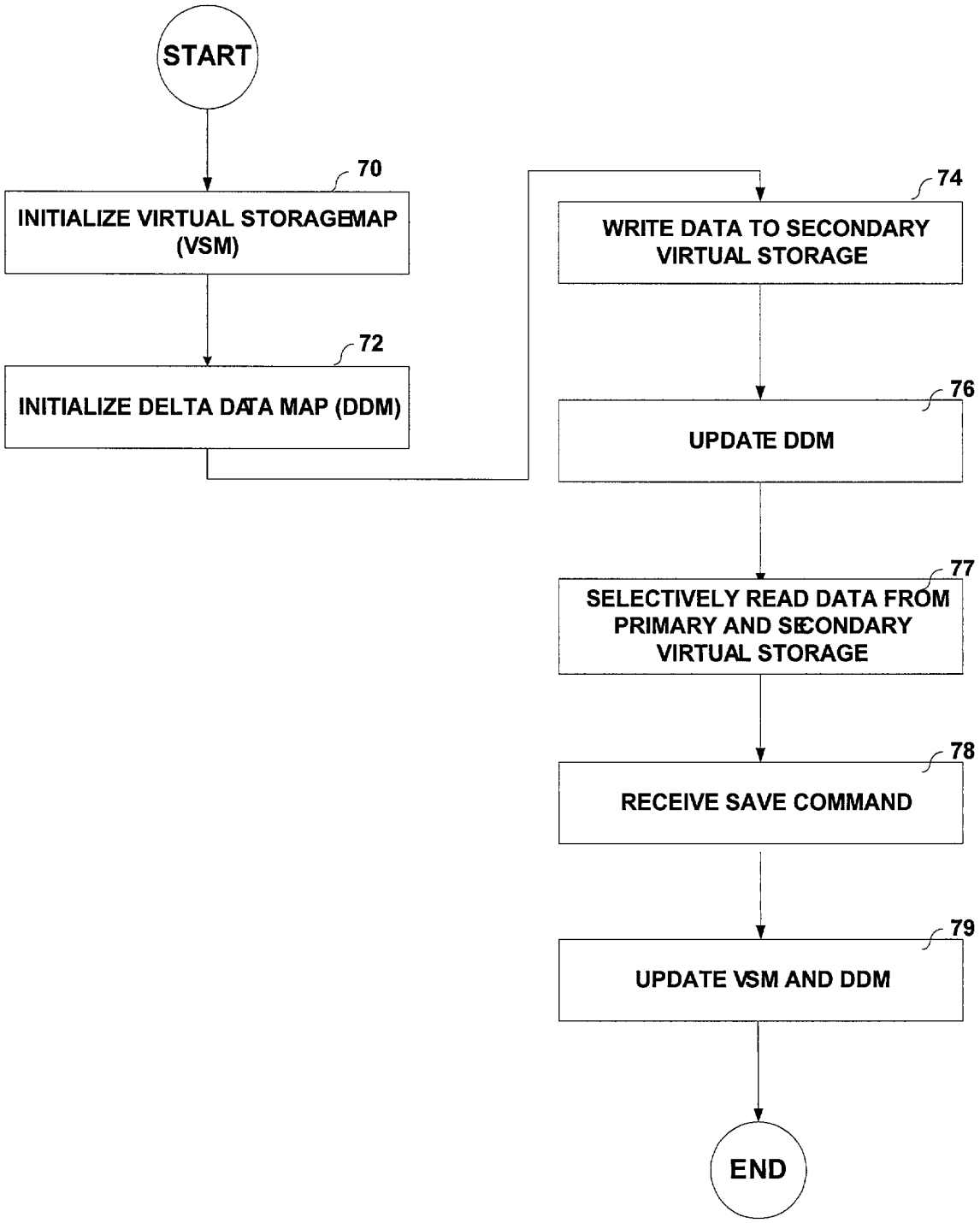
START
70
INITIALIZE VIRTUAL STORAGE MAP (VSM)
72
INITIALIZE DELTA DATA MAP (DDM)
74
WRITE DATA TO SECONDARY VIRTUAL STORAGE
76
UPDATE DDM
77
SELECTIVELY READ DATA FROM PRIMARY AND SECONDARY VIRTUAL STORAGE
78
RECEIVE SAVE COMMAND
79
UPDATE VSM AND DDM
END

FIG. 8

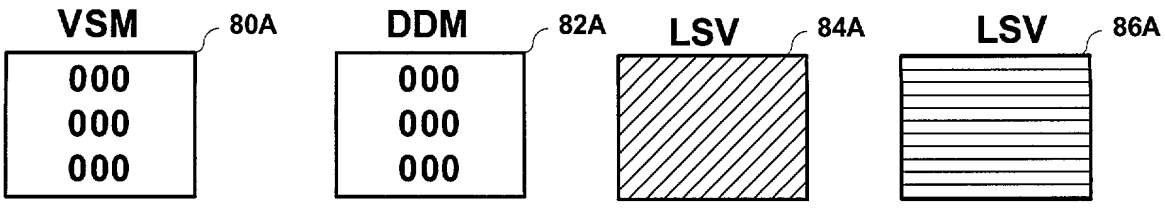

FIG. 9A

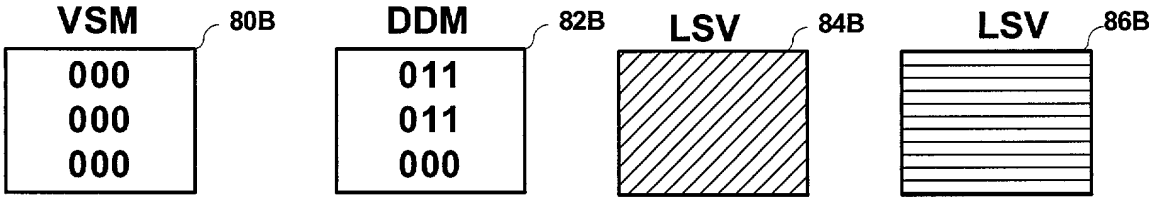

FIG. 9B

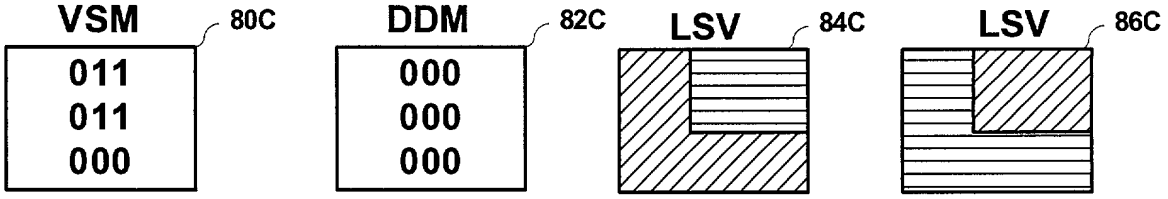

FIG. 9C

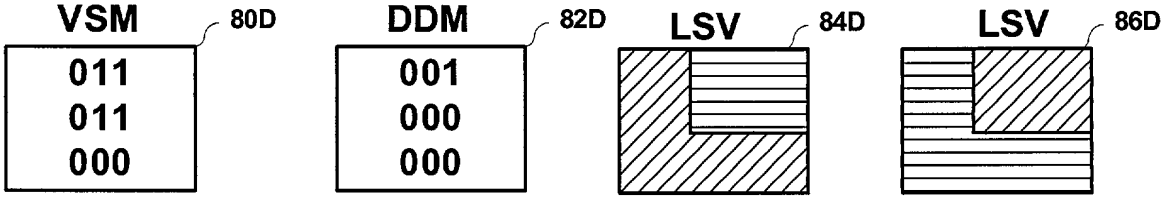

FIG. 9D

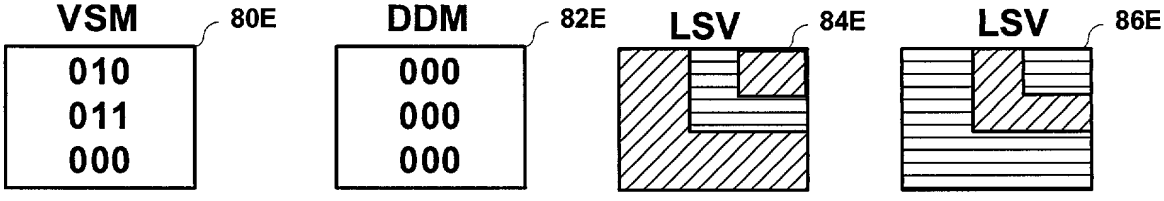

FIG. 9E

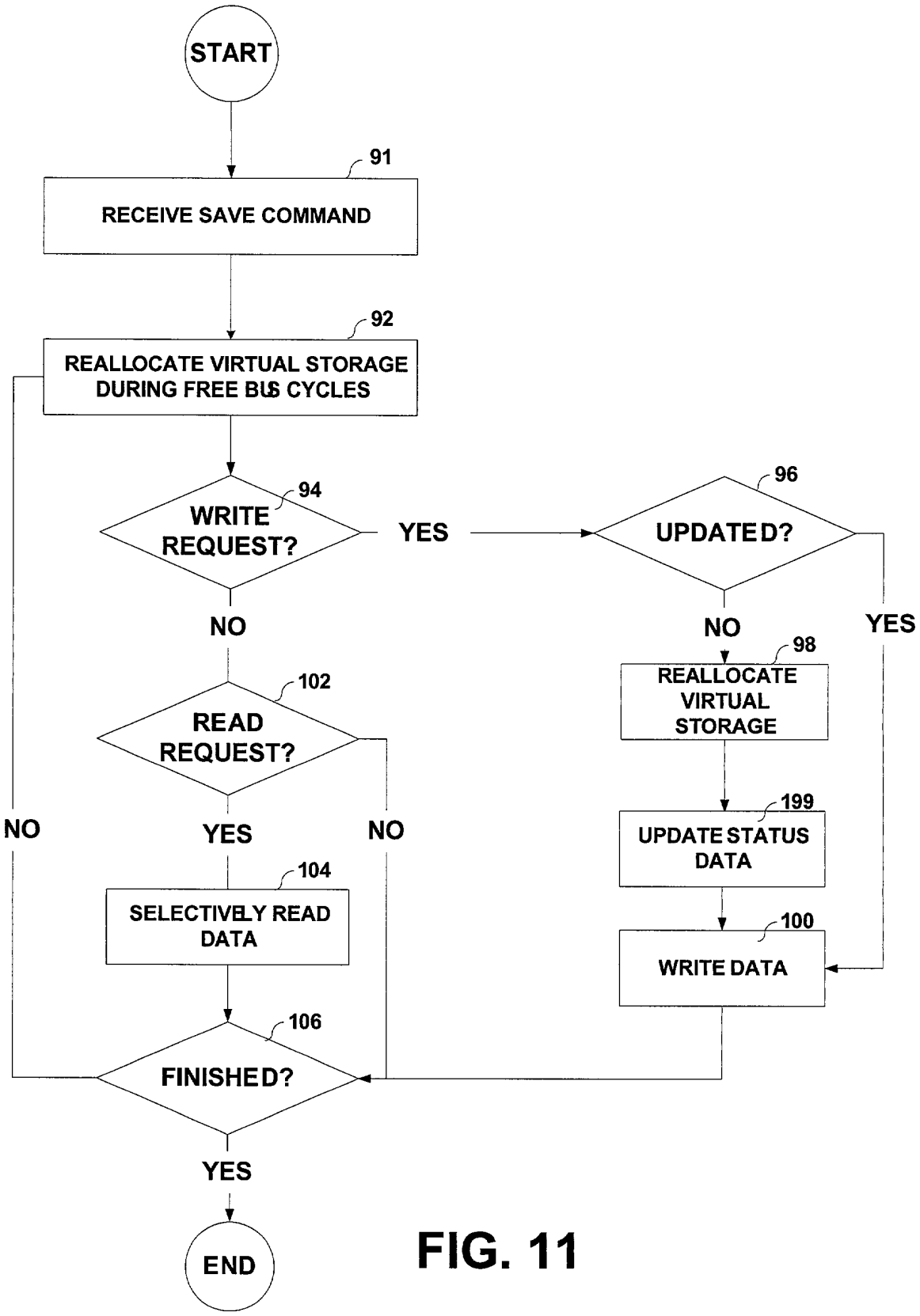
START
91
RECEIVE SAVE COMMAND
92
REALLOCATE VIRTUAL STORAGE DURING FREE BUS CYCLES
94
WRITE REQUEST?
YES
NO
96
UPDATED?
NO
YES
98
REALLOCATE VIRTUAL STORAGE
199
UPDATE STATUS DATA
100
WRITE DATA
102
READ REQUEST?
NO
YES
NO
104
SELECTIVELY READ DATA
106
FINISHED?
NO
YES
END

FIG. 11

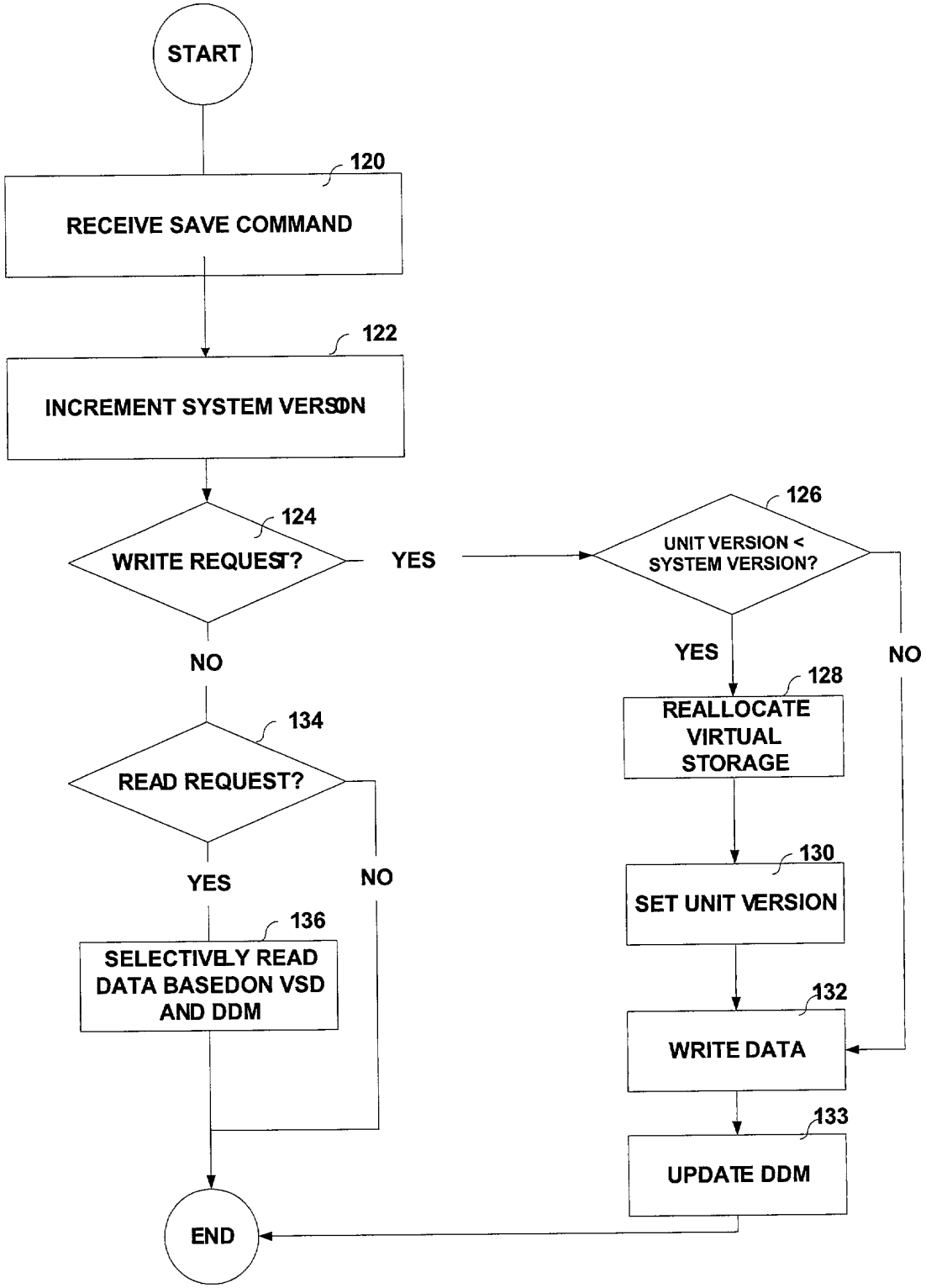
START
120
RECEIVE SAVE COMMAND
122
INCREMENT SYSTEM VERSION
124
WRITE REQUEST?
YES
NO
126
UNIT VERSION < SYSTEM VERSION?
YES
NO
128
REALLOCATE VIRTUAL STORAGE
130
SET UNIT VERSION
132
WRITE DATA
133
UPDATE DDM
134
READ REQUEST?
YES
NO
136
SELECTIVELY READ DATA BASEDON VSD AND DDM
END

FIG. 13

APPLICANT: GASTON R. BIESSENER ET AL.
TITLE: DATA BACKUP AND RESTORATION USING DYNAMIC VIRTUAL STORAGE
ATTORNEY/AGENT: KENT J. SIEFFERT
REG. NO. 41,312 TELEPHONE: 651.735.1100
DOCKET NO.: 1009-003US01 SHEET 10 OF 10

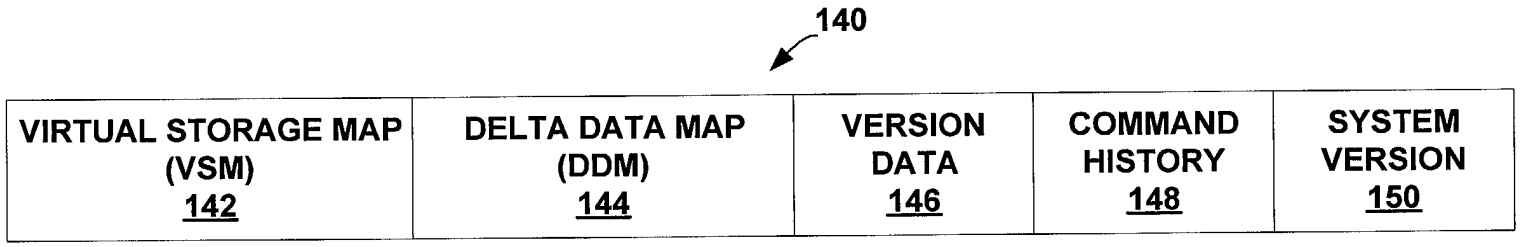

FIG. 14